

ABSTRACT OF THE DISCLOSURE

Provided is a process for producing a fine carbon fiber by a method of thermal decomposition of at least one organic compound containing VIB group element in the periodic table in a molecule using a ultra fine particles comprising at least one transition metal as a catalyst, wherein a gas obtained by separating a fine carbon fiber from a gas coming out from a reaction furnace is cooled to further collect the fine carbon fiber; then a part or the total amount of the above gas is cooled to remove condensed components contained in the reacted gas, and then the above gas is recycled to the reaction furnace; water and the like are separated from the condensate to recycle the unreacted raw material organic compound.